CYCLOTHYRIS (CRETACEOUS BRACHIOPODA) FROM CALIFORNIA

By ELLIS F. OWEN

ABSTRACT

Serial sections confirm the occurrence of *Cyclothyris densleonis* in the Upper Cretaceous of North America ; the known distribution of the genus is extended to California.

Mesozoic brachiopods have not been extensively described within the North American continent, and it is not surprising that little interest has been shown by palaeontologists in the few species of Rhynchonellidae and Terebratulidae already established in the literature. If, on the other hand, some of these records are further investigated, they can provide useful information regarding the ubiquitous nature of some genera and species of little-known distribution.

Among early records of brachiopods from beds of known Cretaceous age are those of Whiteaves (1876–1903) and Anderson (1902, 1958) who described rhynchonelloid brachiopod species which they referred broadly to the genus *Rhynchonella*. More recently Imlay (1937) described a species from the Lower Cretaceous of Mexico which he referred to *Cyclothyris ? subtrigonalis*. This was the first citation, albeit tentative, of the genus *Cyclothyris* from the American continent, but the accompanying transverse serial sections of the species do not support its assignment to this genus.

It was not until 1955 that Cooper, in a description of some brachiopods from the Cretaceous of Arizona, first accurately recorded the genus *Cyclothyris* from North America, describing and figuring a species as *C. americana* from the Mural Limestone (Middle Albian) of the Bisbee Quadrangle. Until this positive record, the genus was considered to have been confined to the Cretaceous of western Europe and England where it is represented by species from the Aptian to Upper Cenomanian.

Anderson (1902) described and figured a rhynchonellid as *Rhynchonella densleonis* from the Middle Cretaceous of Shasta County (Horsetown Group), northern California. Later, in a description of Cretaceous beds of the Pacific coast (Anderson 1958), he considered that beds within the Horsetown Group yielding *R. densleonis* were no younger than Lower Cenomanian in age and that their probable range was from Upper Albian to Lower Cenomanian. A specimen of *R. densleonis* Anderson has recently been obtained from the type section and is described here. From the internal structures seen in transverse serial sections of a specimen (Fig. 4), it can be positively assigned to *Cyclothyris*.

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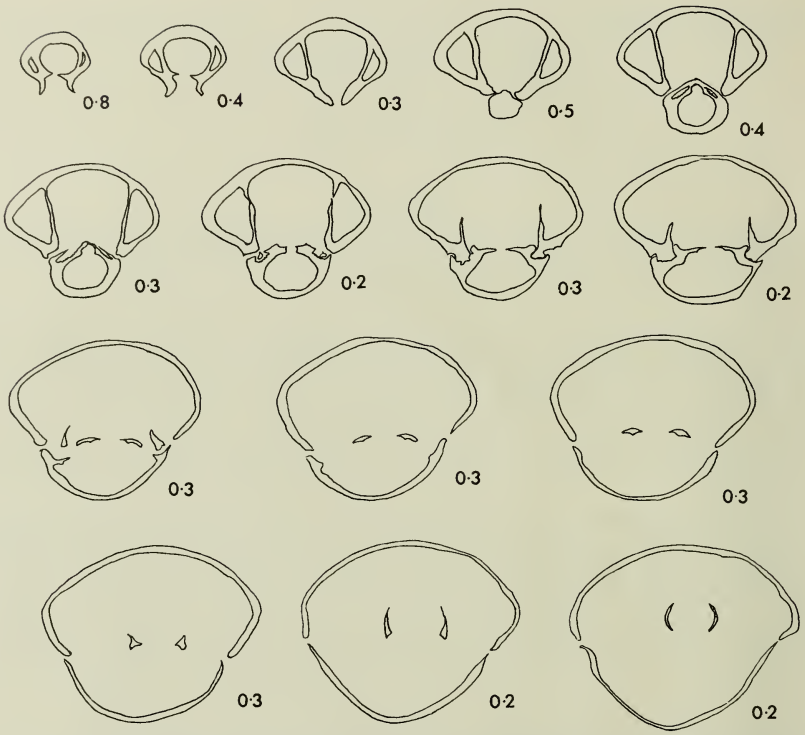

FIG. 4. A series of fifteen transverse serial sections through the umbo of a duplicate specimen of *Cyclothyris densleonis* Anderson from the Horsetown Group (Albian–Cenomanian), Shasta County, California. Geological Survey of America Locality No. 1051. The encircling deltidial plates around the foramen, the comparatively short dental lamellae and general morphology of the hinge-plates are typical of the genus. The numerals denote the distance in millimetres between each section. × 3.

SYSTEMATIC DESCRIPTION

Family **RHYNCHONELLIDAE** Gray 1848

Subfamily **CYCLOTHYRIDINAE** Makridin 1955

Genus ***CYCLOTHYRIS*** M'Coy 1844

Cyclothyris densleonis (Anderson)

Fig. 4; Pl. 5, figs 1–6

1902 *Rhynchonella densleonis* Anderson : 72 ; pl. 7, figs 157, 158.
1958 *Rhynchonella densleonis* Anderson ; Anderson : 86 ; pl. 1, figs 3, 4.

DESCRIPTION. *External characters.* Acutely biconvex *Cyclothyris*, 17·2 mm long, 20 mm wide, 11·9 mm thick. Broadly triangular in general outline. The brachial

valve is slightly inflated ; the pedicle valve has a broad, shallow sulcus originating from about the mid-line and widening anteriorly with a fairly extensive trapezoidal linguiform extension. Shell ornament consists of numerous radiating fine costae or costellae which are affected by a series of marked marginal plications creating a distinctive ornament ; similar ornament is characteristic of *Cyclothyris antidichotoma* (Buvignier) from the Upper Aptian and Lower Albian of France and England. The umbo is slightly produced and the sharp beak suberect. Distinct beak-ridges border an extensive interarea with exposed deltidial plates encircling a medium-sized foramen.

Internal characters. The series of transverse serial sections given here (Fig. 4) for *C. densleonis* have been compared to those of *Cyclothyris latissima* (J. de C. Sowerby), the type-species from Faringdon, Berkshire, as figured by Owen (1962 : 46). The two series of sections appear almost identical in every detail. The characteristic deltidial plates encircling the foramen are shown to perfection, as well as the comparatively short dental lamellae in the pedicle valve. The shape, length and angle of deflection of the hinge-plates also agree, as do the depth of insertion and general quadrate shape of the hinge-teeth.

Remarks. There is an unmistakable similarity between *C. densleonis* (Anderson) and *C. antidichotoma* (Buvignier), but it differs from the latter species in having finer and more numerous costellae, a more acutely triangular general outline, a narrower fold and sulcus, a more inflated brachial valve and considerably smaller overall dimensions. The marginal plicae in *C. densleonis* appear to be more marked within the sulcus and on the faint or incipient brachial fold, where there are usually three or four.

In general outline it is more readily comparable to *Cyclothyris mirabilis* (Walker) from the Lower Albian of Leighton Buzzard, Bedfordshire, but differs in having more, but less acutely developed, marginal plicae, and a slightly more produced umbo ; it is less inflated than *C. mirabilis*.

A species which shows a closer morphological affinity with the American form was described and figured by Panow (1969) as ? *Cyclothyris antidichotoma* (Buvignier), and occurs in Lower Cenomanian beds in the Cracow district of Poland. The specimen figured by Panow (1969 : pl. 109, fig. 9) has a wider anterior sulcus, a slightly less extensive linguiform extension, a less produced umbo and a less acutely inflated brachial valve.

The importance of the present record is that it confirms that of Cooper (1955) in establishing *Cyclothyris* within the Albian and Cenomanian of North America and extends the distribution of that genus to include California. It may be possible in time to investigate the records of other workers, such as Whiteaves (1876–1903), so that a clearer view of the distribution of *Cyclothyris* and similar brachiopod genera may be obtained.

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PLATE 5

Prefix BM(NH) – British Museum (Natural History), London
MHNG – Muséum d'Histoire Naturelle, Geneva, Switzerland

Cyclothyris densleonis (Anderson)

FIG. 1a, b, c. Cretaceous, Horsetown Group, Shasta County, northern California. BM(NH) BB 76200. × 2.

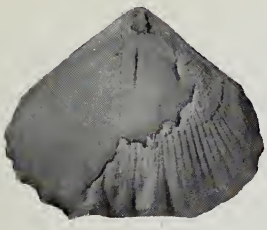
FIG. 4a, b, c. Same locality and horizon. BM(NH) BB 76201. × 2.

Cyclothyris antidichotoma (Buvignier)

FIG. 2a, b, c. Lower Albian, Shenley Hill, Leighton Buzzard, Bedfordshire. BM(NH) BB 41495. × 1.

FIG. 2d. Enlargement of margin of shell of the same specimen as above, showing the typical *antidichotoma* ornament. × 2.

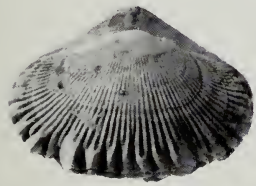
FIG. 3a, b. Albian, Morteau, Doubs, France. Internal mould of a young specimen. MHNG CB 4746. × 2.



1a

1c

1b



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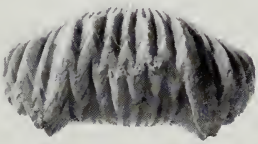

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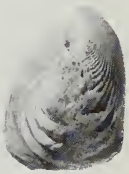

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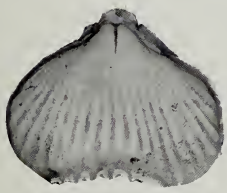

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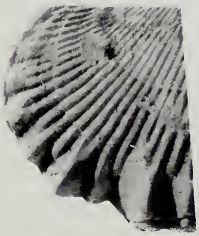

2d

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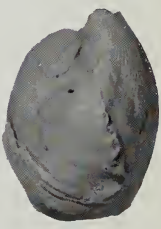
4a

4c



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